

**U.S. PATENT APPLICATION**  
**for**  
**PROCESSING OF DOCUMENTS WITH MEDICAL AND OTHER**  
**WASTE**

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## **PROCESSING OF DOCUMENTS WITH MEDICAL AND OTHER WASTE**

### **FIELD OF THE INVENTION**

**[0001]** The present invention is directed generally to the destruction of documents and specifically to the destruction of documents in combination with medical and other waste.

### **BACKGROUND OF THE INVENTION**

**[0002]** Due to concern over spread of individually identifiable health information and the perceived need for the protection of the privacy this health information, Congress passed the Health Insurance Portability and Accountability Act (HIPAA) in 1996. After several rounds of notice and comment, the U.S. Department of Health and Human Services (HHS) passed privacy rules to implement this Act in 2002. The goal of these rules is to assure that an individual's health information is properly protected while allowing the flow of health information needed to provide and promote high quality health care.

**[0003]** The HHS rules significantly limit the disclosure of an individual's health information - called "protected health information" in the rules – by organizations subject to the rules. Under the rules, acceptable safeguards for protecting the privacy of protected health information include shredding any documents having protected health information or keeping the records under lock and key. Additionally, some health care organizations destroy their documents by incinerating them.

**[0004]** In addition to the generation of a large number of documents having protected health information, health care organizations such as hospitals and clinics generate large amounts of medical waste. Typically, these organizations dispose of these two types of waste in completely distinct ways. That is, the organizations typically engage one waste disposal organization to treat the medical waste and another organization to shred the medical documents. This is both inefficient and expensive.

**[0005]** While it is possible to incinerate both documents and medical waste together, this typically results in the generation of a large amount of toxic emissions. In fact, while incinerators may reduce the volume of solid waste, they typically create toxic emissions, especially when incinerating plastics. In fact, incinerators are the largest source of dioxins, one of the most toxic chemicals known to science. Thus, it would be advantageous to have a single method capable of destroying both documents and medical waste that was efficient, inexpensive and produced little or no toxic air emissions.

#### SUMMARY OF THE INVENTION

**[0006]** The present invention provides a method of destroying documents comprising supplying the documents to an apparatus adapted to shred documents and medical waste, the apparatus having little or no liquid effluent and little or no toxic air emissions, shredding the documents, and discharging the shredded documents from the apparatus.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0007]** The foregoing and other features, aspects and advantages of the present invention will become apparent from the following description, appended claims and the exemplary embodiments shown in the drawings, which are briefly described below. It should be noted that unless otherwise specified like elements have the same reference numbers.

**[0008]** Figure 1 is a schematic illustration of an apparatus suitable for use in methods according to an embodiment of the invention.

**[0009]** Figure 2 is a schematic illustration of a second apparatus according to another embodiment of the invention.

**[0010]** Figure 3 is a schematic illustration of third apparatus according to another embodiment of the invention.

**[0011]** Figure 4 is a schematic illustration of a fourth apparatus according to another embodiment of the invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[0012]** The present inventors have discovered that it is possible to dispose of both medical waste and documents such as those subject to HIPAA rules in a single process while produced little or no toxic air emissions. In particular, the inventors have discovered, that this may be accomplished by judiciously mixing documents having protected health information with medical waste and supplying the mixture to a microwave based treatment apparatus. When fed at an appropriate rate, the documents may be shredded to a level acceptable under the HHS rules. Further, when held in the microwave apparatus for a sufficient amount of time, the biological waste can be destroyed without the generation of dioxins and other toxic byproducts. Additionally, it is noted that the documents need not be restricted to those containing protected health information. Any and all documents can destroyed in the processes according to the various embodiments of the invention discussed in more detail below.

**[0013]** For purposes of the present disclosure, protected health information includes demographic data that identifies an individual or for which there is a reasonable basis to believe can be used to identify the individual. Typically, demographic data includes (1) the individual's physical health, mental health, and/or medical condition, (2) health care services requested by, sought by, recommended to, administered to, and/or prescribed to the individual, and (3) the billing records for the provision of health care to the individual.

**[0014]** More specifically, demographic data Includes: (A) names, (B) geographic subdivisions smaller than a state, where geographic subdivisions smaller than a state includes street address, city, county, precinct, zip code, and their equivalent geocodes, (C) elements of dates for dates directly related to the individual, where elements of dates includes birth date, admission date, discharge date, date of death and age, (D) telephone numbers, (E) fax numbers, (F) electronic mail addresses, (G) social security numbers, (H) medical record numbers, (I) health plan beneficiary numbers, (J) account numbers, (K) certificate/license numbers, (L) vehicle identifiers and serial numbers, (M) license plate numbers, (N) device identifiers and serial numbers, (O) web universal resource locators, (P) internet protocol address

numbers, (Q) biometric identifiers, where biometric identifiers includes finger and voice prints, and (R) full face photographic images.

**[0015]** For the purposes of this disclosure, medical waste may include, but is not limited to:

- (1) cultures and stocks of infectious agents and associated Biologicals, including cultures from medical and pathological laboratories, cultures and stocks of infectious agents from research and industrial laboratories, wastes from the production of biologicals, discarded live and attenuated vaccines, and culture dishes and devices used to transfer, inoculate, and mix cultures;
- (2) pathological wastes, including tissues, organs, and body parts that are removed during surgery or autopsy;
- (3) waste human blood and products of blood, including serum, plasma, and other blood components;
- (4) sharps that have been used in patient care or in medical, research, or industrial laboratories, including hypodermic needles, syringes, pasteur pipettes, broken glass, and scalpel blades;
- (5) contaminated animal carcasses, body parts, and bedding of animals that were exposed to infectious agents during research, production of biologicals, or testing of pharmaceuticals;
- (6) wastes from surgery or autopsy that were in contact with infectious agents, including soiled dressings, sponges, drapes, lavage tubes, drainage sets, underpads, and surgical gloves;
- (7) laboratory wastes from medical, pathological, pharmaceutical, or other research, commercial, or industrial laboratories that were in contact with infectious agents, including slides and cover slips, disposable gloves, laboratory coats, and aprons;
- (8) dialysis wastes that were in contact with the blood of patients undergoing hemodialysis, including contaminated disposable equipment and supplies such as tubing, fitters, disposable sheets, towels, gloves, aprons, and laboratory coats;
- (9) discarded medical equipment and parts that were in contact with infectious agents;

(10) biological waste and discarded materials contaminated with blood, excretion, excudates or secretion from human beings or animals who are isolated to protect others from communicable diseases;

(11) radioactive waste used industrially and in medical procedures as well as chemical waste used in the production of reagents used in laboratories and medical facilities; and

(12) such other waste material that results from the administration of medical care to a patient by a health care provider and is found by the administrator of the EPA to pose a threat to human health or the environment.

**[0016]** Figure 1 illustrates a waste treating apparatus 1 suitable for use in a method of destroying documents and treating medical waste according to a first embodiment of the invention. The waste treating apparatus 1 used in this embodiment is similar to one disclosed in U.S. Pat. No. 5,270,000, which is hereby incorporated by reference. Waste contained in a waste container 13 is delivered to a lift-and-tip mechanism 12. The lift-and-tip mechanism 12 lifts the waste container 13 to the opening of the loading chamber 3 and dumps the waste therein. After dumping the waste into the loading chamber 3, a cover 4 having fluid-tight seal is closed to prevent the escape of germs into the atmosphere. To further inhibit the loss of germs into the atmosphere, the waste treating apparatus 1 includes a suction system 9. The suction system 9 includes a suction pump and at least one filter to capture airborne germs.

**[0017]** In this embodiment of the invention, the documents and medical waste are mixed in the waste container 13 prior to lifting and tipping into the loading chamber 3. However, it is not necessary to premix the documents and medical waste. In other embodiments of the invention, waste containers 13 having only medical waste are alternately loaded with waste containers 13 having only documents. In this manner, the documents and medical waste mix in the waste treating apparatus 1. Further, in these embodiments, it is not necessary to alternately load one waste container 13 of medical waste for each waste container 13 of documents. That is, the ratio of documents to medical waste may be adjusted to ensure proper mixing and destruction of both the documents and the medical waste.

**[0018]** Documents and medical waste dumped into the waste treating apparatus 1 descend in the loading chamber 3 to a blade 6. The blade 6 performs two functions. First, it aids in drawing the waste down the loading chamber 3. Additionally, it performs a first step of cutting the waste into smaller pieces.

**[0019]** Below the blade 6 is a waste comminutor 7. Waste cut by the blade 6 falls to the waste comminutor 7. The waste comminutor 7 shreds the chopped waste to fine pieces, pieces small enough to satisfy the HHS requirements for shredding documents having protected health information. Typically, the waste comminutor 7 includes a pair of counter-rotating blades, however, any suitable shredding mechanism may be used.

**[0020]** After being shredded by the waste comminutor 7, the finely shredded mixture of documents and medical waste falls from the waste comminutor 7 past a series of spray nozzles 19, which spray the shredded waste mixture with water. The water may be supplied from a water tank 20 or from a water line connected to the waste treating apparatus 1. The amount of water sprayed depends on the volume of waste mixture dropping past the spray nozzles 19 and the desired amount of moistening. Preferably, the waste mixture is uniformly moistened.

**[0021]** The moistened waste mixture is then loaded on a conveying helix 24 that conveys the moistened waste mixture through a microwave chamber 16 having a series microwave sources 25. The microwave sources 25 heat the moistened waste mixture to a temperature hot enough to kill bacteria and viruses. In addition to conveying the moistened waste mixture, the conveying helix 24 further mixes the documents and the medical waste to create a more homogeneous mixture of waste.

**[0022]** To ensure that all of the bacteria and viruses are dead, the heated moistened waste mixture is passed from the microwave chamber 16 through a heated passage 46 to a heat maintenance chamber 17. The moistened waste mixture is slowly advanced through the heat maintenance chamber 17 by use of a conveying helix 45. The rate of conveyance through the heat maintenance chamber 17 is adjusted so that the waste remains at a sufficiently elevated temperature for a sufficient amount of time to kill all of the viruses and bacteria. As with the conveying

helix 24, the conveying helix 45 further mixes the documents and the medical waste to create a more homogeneous mixture.

**[0023]** After spending sufficient time in the heat maintenance chamber 17 to kill all of the viruses and bacteria, the moistened waste mixture is passed to an unloading mechanism 50. The unloading mechanism 50 further mixes the moistened waste mixture and advances it through the waste treating apparatus 1 to a treated waste container (not shown). Additionally, as there is no further heat added to the waste, the hot waste mixture undergoes partial cooling while being advance by unloading mechanism 50.

**[0024]** In the embodiment of the invention illustrated in Figure 1, the waste treating apparatus 1 is located on a motor vehicle trailer 52. Thus, the waste treating apparatus 1 of this embodiment is portable. In other embodiments of the invention, the waste treating apparatus 1 is erected in a permanent fashion, preferably adjacent to or nearby the waste generating facility. However, a permanent waste treating apparatus 1 may erected at a location remote to the waste generating facility.

**[0025]** To control process, the waste treating apparatus 1 may include a process-control computer 54. Additionally, a space heating system 53 may be included to provide additional heat to the waste treating apparatus 1.

**[0026]** The waste treating apparatus 1 according to the above embodiments of the invention require very little water for operation. Further, the temperature of operation is low enough so that harmful dioxins are not generated. Thus, there is no large runoff of water typically associated with an autoclave, nor large toxic emissions typically associate with incinerators. In fact, the waste treating apparatus 1 used in the above described methods have little or no liquid effluent and little or no toxic air emissions. Further, the processed waste discharged from the waste treating apparatus 1 is suitable to go directly to a landfill or to a recycling center without additional treatment.

**[0027]** In addition to traditional medical waste, many other infectious or toxic materials can be treated in conjunction with documents by the methods of the present invention. Other embodiments of the invention include diseased animal carcasses, diseased human bodies and natural disaster victims. Additionally,



documents can be mixed with contaminated food in the waste treating apparatuses 1. In still another embodiment, the documents may be mixed with illegal drugs or expired pharmaceuticals.

**[0028]** Figure 2 illustrates a waste treating apparatus 101 according to another embodiment of the invention. The waste treating apparatus 101 according to this embodiment of the invention is similar to the waste treating apparatus 1 of the previous embodiments, however it includes the ability to preheat waste in the loading chamber 3. That is, the waste treating apparatus 1 includes an air recycle pipe 104 that extends from the exit of the microwave chamber 116 to the loading chamber 3. Also included is a pump 102 which pumps hot air from the exit of the microwave chamber 116 to the loading chamber 3. In this manner, hot air from the exit of the microwave chamber 16 may be used to heat the waste as it enters the loading chamber 3. As may be appreciated by one of ordinary skill in the art, the preheat mechanism of this embodiment may be used in combination with any of the other disclosed embodiments even though it is only illustrated in this embodiment.

**[0029]** Figure 3 illustrates another embodiment of the invention. In this embodiment of the invention, the waste treating apparatus 201 is configured for continuous treatment of waste. That is, the medical waste and documents are continuously feed into the waste treating apparatus 201. This may be accomplished through a conveyor system (not shown) or any other continuous feed mechanism known in the art.

Initially, the waste is prevented from exiting the waste treating apparatus 201 by a cover 64 which blocks the path from the temperature maintenance chamber 117 to the unloading mechanism 50. When the waste has spent a sufficient amount of time in the temperature maintenance chamber 117 to kill all of the bacteria and viruses, the cover 64 is removed, allowing the waste to pass from the temperature maintenance chamber 117 to the unloading mechanism 50.

An additional aspect of this embodiment concerns the unloading mechanism 50. In this embodiment, the unloading mechanism 50 has a diameter that is less than the diameter of the microwave chamber 116. This results in a partial compaction of the waste while exiting the waste treating apparatus 201. To further increase

compaction, a compactor 120 may optionally be added to the exit of the waste treating apparatus 201.

**[0030]** Still another aspect of this embodiment is the inclusion of a second, conductive, heating mechanism. This aspect includes a fluid reservoir 68, a fluid pump 71 and piping 69. Further, in this embodiment, the microwave chamber 116 and temperature maintenance chamber 117 are double wall chambers having a gap between the walls. Fluid from the fluid reservoir 68 is pumped through the double wall of the temperature maintenance chamber 117, thereby being heated. It then flows through the double walls of the microwave chamber 116. In this manner additional heat is added to the waste as it travels through the microwave chamber 116. As may be appreciated by one of ordinary skill in the art, the conductive heating mechanism of this embodiment may be used in combination with any of the other disclosed embodiments even though it is only illustrated in this embodiment.

**[0031]** Figure 4 illustrates additional embodiments of the invention. In this embodiment, the waste treating apparatus 301 includes a secondary radiation source 106 added to the temperature maintenance chamber 17. The secondary radiation source 106 preferably is either a microwave or an infrared heat source. However, X-ray and UV sources may be used as well. In addition to the secondary radiation source 106, the waste treating apparatus 301 may also include an ozone generating electrode 108 either singly or in combination with the secondary radiation source 106. The ozone generated from the ozone generating electrode 108 is highly oxidizing and is known to kill germs. Thus, the addition of the ozone generating electrode 108 increases the likelihood that all of the bacteria and viruses in the medical waste are killed.

**[0032]** The foregoing description of the invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form disclosed, and modifications and variations are possible in light of the above teachings or may be acquired from practice of the invention. The drawings and description were chosen to explain the principles of the invention and its practical application. It is intended that the scope of the invention be defined by the claims appended hereto, and their equivalents.